

Cross-Media Electronic Reporting and Records Rule Cost-Benefit Analysis

EP908T2

March 2001

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Chapter 1

Introduction

LEGISLATIVE BACKGROUND

With the Cross-Media Electronic Reporting and Records Rule (CROMERRR), the U.S. Environmental Protection Agency (EPA) proposes to enable, with limited exceptions, submitting and storing documents electronically. The documents in particular are those that can be or must be created or submitted because of the requirements of Title 40 of the *Code of Federal Regulation*.

Electronic reporting and record keeping are strongly mandated by federal policy and law. EPA's Reinvention of Environmental Information Plan, derived from the President's Reinventing Government policy of 1995, outlines EPA's strategy to work with states and industry to improve compliance reporting. The March 1996 *Reinventing Environmental Information Report* states that electronic reporting supports the President's goals by reducing the burden of compliance and streamlining regulatory reporting. Also, the Government Paperwork Elimination Act of 1998 mandates that agencies provide the option of maintaining, submitting, or disclosing information electronically as a substitute for paper by October 21, 2003. Further, the advances in the tools and technologies for transferring and managing data during the past decade have increased productivity throughout government and business.

OVERVIEW AND PURPOSE OF CROMERRR

CROMERRR removes regulatory obstacles to electronic reporting and record keeping across a broad range of EPA programs and establishes requirements for assuring those electronic documents and electronic records are as valid and authentic as their paper counterparts.

Electronic reporting is the sharing of information by submitting or accepting compliance reports, lab data, permits, or other transactions from regulated facilities, states, or other stakeholders by using electronic rather than paper means. The record-keeping part of CROMERRR addresses the process of maintaining documents in electronic media. Electronic record keeping is the storing, maintaining, and retrieving of documents while ensuring their authenticity and integrity.

For regulated entities that choose to submit documents electronically, CROMERRR requires that the documents be submitted to an electronic document-receiving system that is "certified" by EPA. EPA defines "certified" as satisfying certain general criteria, such as system security, approach to electronic

signature and certification, and having a method for archiving documents. For regulated entities that choose to keep records electronically, the rule requires they adopt best practices for managing electronic records.

In conjunction with this rulemaking, EPA is developing a centralized, agency-wide electronic report-receiving system, the Central Data Exchange (CDX), that EPA will certify as satisfying the criteria specified in CROMERRR. Regulated entities that want to submit electronic documents directly to EPA would satisfy the requirements in the rule by successfully submitting their reports to the CDX. For facilities that submit documents to states that are authorized to administer a federal environmental program, CROMERRR allows submitting documents electronically to state document-receiving systems that are certified as satisfying the specified criteria. CROMERRR does not specify how states design electronic record keeping systems or transfer their data to EPA.

The most important change that CROMERRR makes to current policy is the technical approach to electronic reporting. Although EPA will continue to support data transfer using standards-based electronic data interchange (EDI), the agency also will use options, such as Web forms, for completing documents on line or for downloading and completing off line. For signing documents electronically, EPA plans to emphasize digital signatures based on public key infrastructure (PKI) certificates.

EPA is proposing the rule to take advantage of significant improvements in information technology and to implement a system that does not mandate specific technology but is consistent with the standard practices of Web-based electronic commerce.

This report describes our economic analysis that compares the current, or “as-is” reporting and record-keeping system with the “to-be” system proposed in CROMERRR.

In summary, CROMERRR will reduce the paperwork burden for EPA, states, and facilities. EPA estimates that CROMERRR could reduce the average annual reporting cost by \$52.3 million per year for reporting facilities, \$1.6 million per year for EPA, and \$1.24 million for each of the 30 states that we assumed would implement the reporting programs over the 8 years we analyzed.¹

These savings occur because a large percentage of the costs for the information collection request (ICR) are, either directly or indirectly, for processing the inbound reports. In addition, electronic reporting and record keeping encourages EPA and states to consolidate facilities for processing electronic records.

¹ The costs and savings are based on FY 2000 dollars and use a 7 percent discount rate.

DOCUMENT ORGANIZATION

The remainder of this document is organized as follows:

- ◆ *Chapter 2, Method and Data Sources*—In this chapter, we describe the methods used for calculating costs as well as the sources of the cost data.
- ◆ *Chapter 3, Cost Analysis*—In this chapter, we compare the costs for “as-is” and “to-be” scenarios for facilities, states, and EPA.
- ◆ *Chapter 4, Qualitative Benefits*—This chapter describes the qualitative benefits of CROMERRR. Qualitative benefits are tangible benefits that the stakeholders may realize but are difficult to quantify.
- ◆ *Chapter 5, Conclusions*—In this final chapter, we present the conclusions of the cost-benefit analysis.
- ◆ *Appendix A, Information Collection Requests*—This appendix lists the ICRs from which we extracted key cost and submitted data.
- ◆ *Appendix B, Facility Costs*—This appendix describes detailed assumptions and cost data for facilities for the as-is and to-be scenarios.
- ◆ *Appendix C, State Costs*—This appendix describes detailed assumptions and cost data for states for the as-is and to-be scenarios.
- ◆ *Appendix D, EPA Costs*—This appendix describes detailed assumptions and cost data for EPA for the as-is and to-be scenarios.
- ◆ *Appendix E, Abbreviations*—This appendix contains abbreviations used in the report.

Chapter 2

Method and Data Sources

This chapter describes the methods we used to develop the CROMERRR cost-benefit analysis (CBA) model. The CBA model includes as-is reporting burdens and costs and estimated to-be costs and projected savings as they affect all stakeholders when the CROMERRR is implemented.

AS-IS COST ANALYSIS

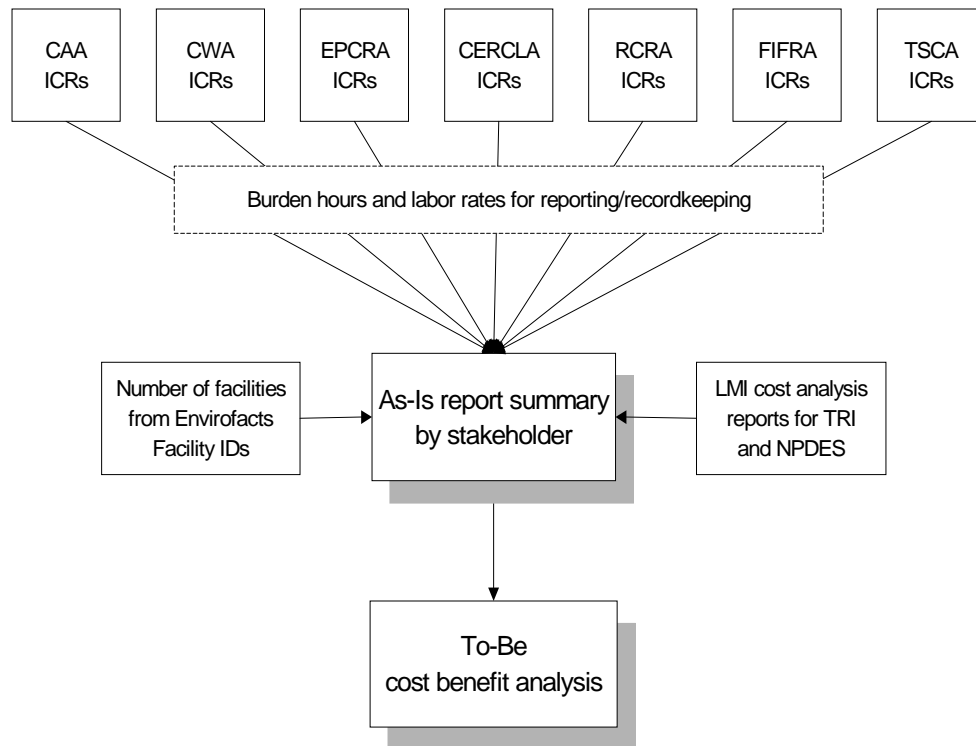
The as-is cost analysis summarizes the total cost associated with current EPA reporting programs. These costs reflect activities with no CDX in operation. The analysis summarizes the reporting burden and costs for direct reports (those submitted directly to EPA) and indirect reports (those submitted to either state or local agencies).

Figure 2-1 is an overview of the methods used in the as-is cost analysis. The as-is costs for the EPA reporting programs are based on burden and cost estimates from more than 50 ICRs that were identified as the primary programs affected by this rule (see Appendix A). The primary programs include the following

- ◆ Clean Air Act (CAA)
- ◆ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- ◆ Emergency Planning and Community Right-To-Know Act (EPCRA)
- ◆ Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- ◆ Clean Water Act (CWA)
- ◆ Resource Conservation and Recovery Act (RCRA)
- ◆ Toxic Substances Control Act (TSCA).

We extracted burden hours and labor rates for reporting and record keeping from the ICRs and entered them into a model that totals the costs for reporting programs for each stakeholder (facility, state, and EPA). Costs not directly associated with either reporting or record keeping are not included in this analysis.

Figure 2-1. As-Is Cost Analysis Methods



We included the number of facilities subject to reporting requirements and the projected number of ICR submissions per year in the report summary model. Because many facilities submit data for multiple programs, we did not use the ICRs to estimate the number of facilities affected by CROMERRR. Instead, we determined the number of facilities subject to reporting requirements by totaling number of EPA facility identifications (IDs) in the *EnviroFacts* database.

If burdens in an ICR were not clearly attributed to reporting or record-keeping activities, we made assumptions to allocate those costs or disregarded them if they were not relevant to this analysis (see Appendix A).

We used detailed Logistics Management Institute (LMI) reports about cost analysis of the Toxic Release Inventory (TRI) and National Pollution Discharge Elimination System (NPDES) programs to supplement the cost information from the ICRs. Our analyses break out the reporting program costs into program management; mail receipt; capture, reconciliation, archiving, and distribution of data; compliance and enforcement; and information systems.

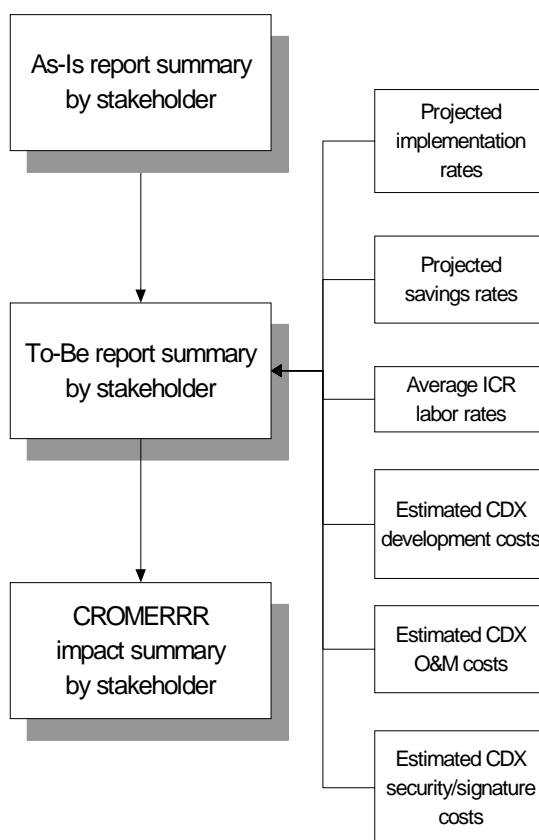
We used the as-is report summary model, which is based on the ICRs and LMI reports, as the baseline for the to-be cost-benefit analysis.

TO-BE COST-BENEFIT ANALYSIS

The to-be CBA estimates the costs for EPA programs reporting through the CDX. We did the analysis using the CROMERR CBA model. The model projects the reporting burden, costs, and savings for electronic and paper reporting and record keeping for FY00 through FY07.

Figure 2-2 is an overview of the methods we used to develop the to-be CBA estimates. To develop the to-be for each stakeholder, we used the as-is report summary model as the baseline. We applied projected implementation rates for electronic reporting (web, EDI, and eXtensible markup language [XML] formats) by stakeholder and report to the baseline over the 8 years. As electronic reporting is implemented, the savings rate is also applied. We added the costs for development, operation, and maintenance, as well as security and digital signatures for electronic reporting to the projected costs to determine the effect of the CROMERRR. The methods we used for estimating these costs for each stakeholder are described below.

Figure 2-2. To-Be Cost Benefit Analysis Methods



Facility Costs

The cost estimates for electronic reporting, by facility, include programs which facilities report directly to EPA or the state, or both. Facility electronic reporting costs include costs for developing the system and for operating and maintaining reporting and record-keeping systems.

We estimated reporting facilities' development costs for hardware and software (for large and small facilities) and digital signature certification. In addition, we estimated a one-time cost per report for mapping EDI and XML file structures for facilities submitting via EDI or XML only (see Appendix B).

We estimated operational reporting costs by applying the implementation rate to the as-is burden hours per submission to derive the projected burden for electronic reporting (see Appendix B):

- ◆ *Direct reporting.* For facilities that report TRI and risk management plan (RMP) forms directly to EPA, approximately 50 percent of TRI submissions are electronic in FY02 and 50 percent of RMP submissions are electronic in FY03. By FY07, approximately 90 percent of TRI and RMP submissions are reported electronically. For other direct reports, 25 percent of facilities report electronically in FY03 increasing to 65 percent by FY07.
- ◆ *Indirect reporting.* For facilities that must send discharge monitoring reports (DMRs) to states, approximately 25 percent send them electronically in FY02 and that percentage increases to 50 percent by FY07. For other delegated programs, five new states will implement electronic reporting each year, beginning in FY02. For facilities reporting in those states, 50 percent send reports electronically in the first year of implementation, increasing to 85 percent by the fourth year of implementation.

The projected operational burden for reporting is multiplied by a savings rate to reflect the potential savings derived from electronic reporting (e.g., reduced burden for mail receipt, data capture, and data reconciliation) (see Appendix B). We estimated the total cost of operational reporting by using an overall labor rate that is derived from the average ICR labor rates (see Appendix A) and a discount rate of 7 percent.¹ Maintenance costs for reporting are included beginning in FY02.

Estimated electronic record-keeping costs begin in FY02 for TRI reports, DMRs, and other indirect reporting to delegated programs. Electronic record-keeping costs begin in FY03 for other reports. Record-keeping costs include hardware, software, and labor for setting up an electronic record-keeping system. From FY03 through FY07, annual software and hardware maintenance costs and labor

¹ We used mid-year discount factors for the discount rate of 7 percent from the Office of Management and Budget Circular A-94.

costs are included with a one-time set-up fee and charge per document for record-keeping storage.

State Costs

State costs are for developing the electronic reporting system and operating and maintaining the system. Development costs include costs for hardware and software, labor, digital signature certification, and a one-time charge per report for mapping EDI and XML file structures. The mapping cost is incurred by states as they implement electronic reporting (see Appendix C).

We estimated the state operational costs by using an implementation rate in which five states implement electronic reporting in FY02, increasing incrementally by five states annually, to 30 states implementing electronic reporting by FY07. Maintenance costs for electronic reporting begin in FY02.

EPA Costs for Direct Reporting

EPA costs for direct reporting and record keeping are the costs incurred by EPA because of programs for which reports are submitted directly to EPA. These costs primarily include the cost of receiving, processing, and storing data as well as costs for digital signature certificates and signatures for direct reporting facilities.

The estimates for direct reporting cost include costs for developing the system and EPA's operation and maintenance of the system. The initial system development costs to EPA for the CDX prototype occur in FY00 and FY01 and include costs for developing the hardware and software, as well as contract and EPA labor (see Appendix D).

For FY02, the development costs are primarily attributed to upgrading the CDX prototype for production and providing redundant systems for security and operations. These costs are necessary in upgrading CDX from the prototype system to a fully functional system. System development costs continue during this period, with the costs for refining the hardware and software added for each of the years from FY03 through FY07. Hardware and software technology upgrade costs (updating hardware and software systems) are included in FY07.

For FY02, operational costs are included only for TRI and DMR electronic submissions, because CDX will not be fully operational (see Appendix D). The CDX will not receive production data from all programs until FY03. For FY02, as electronic reporting is implemented, EPA will incur operation and maintenance costs for facility and state digital signature certificates and transactions (there is an initial cost for obtaining a digital signature certificate and an additional per signature charge to use the certificate). Other costs for FY02 include those for hardware and software maintenance (see Appendix D).

For FY03, operation and maintenance costs include contract and EPA labor for the production system, the costs for digital signatures for the approximately 45 percent of reporting facilities implementing electronic reporting, and signature record-keeping. Maintenance costs include hardware and software maintenance, CDX facility (lease, utilities, and communications expenses), and miscellaneous supplies.

Operation and maintenance costs continue from FY04 through FY07 with the number of facilities reporting electronically increasing from 59 percent in FY04 to 77 percent by FY07. Record keeping begins in FY02 for TRI reports and DMRs. Record keeping for all programs begins in FY02 when CDX is implemented.

Chapter 3

Cost Analysis

INTRODUCTION

This chapter presents our analysis of CROMERRR costs and benefits. It describes both as-is and to-be costs for three key stakeholders: facilities, states, and EPA. We compared annual costs over 8 years, from FY00 (when the first work on the EPA CDX began) to FY07, 5 years after the CDX is fully implemented.

We based the analytic model and methods on compliance program areas and proposed implementation rates, by stakeholder, for each program. This chapter focuses on the costs (burden) for each of the stakeholders. Below we summarize the costs for each stakeholder. We used two primary assumptions for all of the stakeholders:

- ◆ Report volume is based on FY00 volume of submitted reports. We derived this number by totaling the submission volumes identified in the ICRs. We increased the base volume by 4 percent per year to account for potential increases in both reporting requirements and the number of reporting facilities. The volume does not include adding new major programs.
- ◆ We based labor hours and rates on blending the diverse job types, costs, and ratio of hours from the ICRs.

On the basis of this analysis, EPA estimates that CROMERRR could result in an average annual reduction in burden of \$52.3 million per year for those facilities reporting, \$1.6 million per year for EPA, and \$1.24 million for each of the 30 states that we assumed would implement programs during the 8 years covered by our analysis.

FACILITIES

Facilities measure, monitor, collect, and organize data about their interactions with the environment (e.g., air emissions and waste discharges). Once facilities collect the data, they complete a regulating agency's defined form and submit it to the appropriate environmental agencies. Usually, facilities must retain a copy of each submitted report as well as supporting information. To retain the data, each facility must reproduce, log, and store the reports. If the regulating agencies discover errors on the forms or have questions about submitted forms, they will follow-up with the facilities. All of these activities and others, such as training, are covered under the reporting and record-keeping functions of the ICRs we reviewed for this analysis.

As-Is Cost Analysis

The as-is cost analysis for facilities is based on a review of the more than 50 ICRs listed in Appendix A as well as LMI research on the TRI, DMR, and drinking water programs. For the eight programs we included, we combined the costs and averaged the reported costs but manipulated the data no further.

In the ICRs, the primary functions of paper reporting and record keeping include

- ◆ collecting compliance data;
- ◆ completing and, as needed, signing forms;
- ◆ mailing the forms to the appropriate environmental agency;
- ◆ making copies, filing, and retaining logs;
- ◆ responding to environmental agency questions, audits, and inspections; and
- ◆ providing management, information systems, and training support.

In addition to the labor to perform these functions, the facilities must provide infrastructure and physical resources, such as space, filing cabinets, and envelopes.

Table 3-1 summarizes the number of facilities, the annual volume of submissions, and the burden dollars for all of the programs for the 8 years covered in our analysis.

Table 3-1. Facility As-Is Costs

| | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of facilities (M) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Report volume (M) | 2.9 | 3.0 | 3.1 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 |
| Reporting burden (\$ M) | 3,728.0 | 3,748.0 | 3,643.1 | 3,541.0 | 3,441.4 | 3,345.0 | 3,251.5 | 3,160.3 |
| Record-keeping burden (\$ M) | 135.0 | 135.7 | 131.9 | 128.2 | 124.6 | 121.2 | 117.8 | 114.5 |
| Total burden | 3,863.0 | 3,883.7 | 3,775.0 | 3,669.2 | 3,566.0 | 3,466.2 | 3,369.3 | 3,274.8 |

For this analysis, to compare the current paper environment to the to-be electronic environment, we assumed that paper submissions will continue throughout the 8 years covered by our analysis. Details of facility “as-is” costs are in Appendix B, however, a few of the key assumptions are as follows:

- ◆ Because the as-is data reflects the existing process, we have not incorporated any setup or development costs, except when they are incorporated into existing ICRs. The system reflects the steady state of paper reporting.

- ◆ From the ICRs and EPA's Envirofacts database, we have determined that approximately 1.2 million reporting facilities exist, of which approximately 90,000 report directly to EPA. Most of the facilities report for multiple programs either to states or EPA.
- ◆ We have increased the number of submissions and burden costs by 4 percent annually for the 7 additional years of the analysis. This increase reflects potential growth in reporting requirements. This captures what we consider as real growth.

Although our analysis is not intended to review the paper process, clearly the process is both expensive and time consuming.

To-Be Cost Analysis

Below we present the costs for the to-be scenario in which facilities transition to electronic reporting and record keeping. For both electronic reporting and record keeping, we assume that facilities will have one-time development charges followed by on-going costs for operating for succeeding years.

ELECTRONIC REPORTING

When establishing projected estimates of costs and savings of electronic reporting and record keeping, EPA had to establish a baseline of current costs. The current costs of paper-based reporting to EPA and states with delegated authority to manage an EPA reporting program were based on an extensive assessment of EPA's official ICR submissions that would be subject to CROMERRR, as well as more detailed cost estimates of major EPA systems. In analyzing the current costs, EPA extensively reviewed more than 50 ICRs and summarily reviewed approximately 70 other ICRs. A list of the ICRs, and the approach used to analyze them, are in Appendix A of *EPA's Cross Media Electronic Reporting and Record-keeping Rule Cost Benefit Analysis*.

In addition to the ICR analysis, EPA analyzed commercial and government agencies' general costs for and benefits of electronic reporting, as described in the *EPA Electronic Reporting Benefit/Cost Justification Report* (June 30, 1999). EPA also analyzed business processes and associated costs for several major EPA programs in depth. These analyses include analyses of reports for TRI, NPDES, Public Water Supply System (PWSS), and CAA programs. While analyzing the ICR costs for these programs, EPA broke the reporting costs into discrete functional areas (such as data entry, mailing, reconciliation, archiving, and program management) and analyzed the costs. In addition, EPA, in conjunction with state partners in the Arizona Department of Environmental Quality (ADEQ) and the Texas Natural Resources Conservation Commission (TNRCC), assessed the potential effects and opportunities of environmental electronic reporting on the EPA-delegated state programs and affected regulated entities. These programmatic and state analyses are available in the CROMERRR docket. EPA also reviewed similar analyses of other

EPA electronic reporting, such as the proposed Hazardous Waste Manifest Automation Rule. EPA invites comments on its analytical approach and on the list of ICRs analyzed—whether this list encompasses the spectrum of EPA requirements affected by CROMERRR and what other information should be collected for further analyses.

Electronic reporting includes the collecting of compliance data, “entry” of the data into some form of computer system, and the electronic transmission of that data to the appropriate environmental agency. Electronic reporting includes the actions necessary for a facility to register with regulating agencies to report electronically and to sign the appropriate transactions digitally.

CROMERRR does NOT mandate electronic processing. Facilities will opt to report electronically only if they deem that it is cost-effective. This fact, combined with increasing use of automation and electronic commerce (EC), even by small companies, leads us to conclude that the facilities that implement electronic reporting will already have the appropriate information technology infrastructure and will not acquire it solely for reporting electronically. We have, therefore, not associated any burden for acquiring hardware, software, telecommunications, or associated components.

One of the most difficult factors to estimate is how quickly facilities will implement electronic reporting. We believe that medium-to-large companies will implement fairly quickly, but the majority of small-to-medium companies may implement more slowly. Further complicating the implementation rate is that most facilities report through their state environmental agency rather than directly to EPA.¹ Facilities can only report electronically if their state trading partner has that capability. We assumed the first states will implement in FY02 with an increasing number implementing in succeeding years. The effect of this is a kind of double depression. For example, if in FY02, 10 percent of the states implement and only 50 percent of their facilities implement, then nationwide, only 5 percent of the facilities will have implemented. This effect creates a slow ramp-up of savings, which will be alleviated over time. The overall rate of implementation is shown in Table 3-2. We have estimated a somewhat higher rate of implementation for non-delegated reporting directly to EPA for cases in which earlier electronic reporting for TRI and RMP had implementation rates of 70 percent or higher very quickly.

The second component of measuring the costs and benefits of electronic reporting is how facilities will implement it. EPA plans to offer facilities at least three means of electronic submission: web forms, EDI, and XML. Web forms are most suitable for facilities that submit few reports because the investment cost is

¹ In this analysis, we refer to reports as being one of three types: delegated—those submitted to state agencies (e.g., the air program), non-delegated—those sent directly to EPA (e.g., TRI, and RMP—even if they also may be submitted separately to the state), and mixed—those that are sent to either the state or EPA (e.g., NPDES). We recognize this is a simplification of a very complex process.

nominal, and it is very easy to do. Facilities will need only a PC, printer, and Internet access to connect to the appropriate environmental agencies' website. EPA is enhancing the burden-reduction opportunities of using web forms by

1. pre-populating forms with basic facility information (name, address, ID numbers, etc.), and, in some cases, with some of the data from the last submission;
2. incorporating some intelligent help functions to aid the user in preparing the form; and
3. incorporating automated responses from EPA to the submitter (i.e., electronic acknowledgements, error messages, etc.) so the submitter can quickly and easily audit and manage records of electronic submissions.

In terms of reducing burden, these steps will reduce the amount of "new" data entry required, and improve the quality of the data that is entered, thereby reducing the number of erroneous submissions that need to be reconciled. Also by automating responses back from the EPA, the submitter will have to devote less time tracking the status of submissions and managing paper logs and files. We have assumed that each reporting facility will save 11 percent by reporting electronically via web forms.²

For companies that choose to deploy XML or EDI, the costs are higher but the benefits are appreciably greater. In general, EDI-using companies will be larger, Fortune 1000-type companies that have invested heavily in EDI and maintain sophisticated environmental management systems (EMSs). In many instances, they have fully automated their environmental monitoring, collection, and data storage by tying their monitoring devices to the EMSs. Rather than key the data directly into web forms, these types of companies will choose to "connect" their current EMS to EPA's data format, and submit the data through a process that is largely automated. They also may choose to integrate EPA's electronic responses (e.g., electronic acknowledgement, error reports) into their automated EDI system, thereby enhancing their overall environmental auditing and managing of records. XML poses similar benefits and issues as EDI and is the more current format and transmission standard. The XML-using companies will probably range from the very large Fortune 1000 to the medium or smaller companies that have invested in managing data through off-the-shelf database products. In these cases, XML, like EDI, can be effective for automating data exchanges to EPA in a standard format without having to reenter the data onto a web form. Although XML is still evolving, clearly it can enable companies to manage the data on their system independent of EPA's reporting formats.

² The 11 percent savings assumed for reporting facilities that submit via a web form is a qualitative judgment based on reducing the following costs analyzed in the TRI reporting program: mail receipt (for receiving information provided by EPA), data capture (by using automated data input and form pre-population), data reconciliation (by improving data entry), and data distribution (for electronic submittal).

For these companies, setting up EDI or XML transfers would have a notable initial setup cost (estimated at \$4,000 per report), but would eliminate data entry and other costs in following years. These costs were applied by form and the implementation rate shown in Table 3-2. We have identified both EDI and XML as separate lines because each approach has strong advocates. Although EDI has a strong existing base, most new development is in XML. However, for our cost-benefit analysis, we rate them as equivalent. For both we have assumed a 25 percent savings over paper.³ The implementation rates of XML, EDI, and web forms are shown in Table 3-2.

*Table 3-2. Facility Implementation Rates by Reporting Method
(in percentages)*

| Reporting method | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|------------------|------|------|------|------|------|------|------|------|
| <i>As-is</i> | | | | | | | | |
| Delegated | 100 | 100 | 95 | 89 | 81 | 73 | 64 | 55 |
| Non-delegated | 100 | 100 | 96 | 66 | 50 | 45 | 36 | 28 |
| Mixed delegation | 100 | 100 | 96 | 77 | 66 | 59 | 50 | 42 |
| <i>Web</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delegated | 0 | 0 | 4 | 8 | 12 | 18 | 24 | 30 |
| Non-delegated | 0 | 0 | 3 | 25 | 32 | 37 | 42 | 48 |
| Mixed delegation | 0 | 0 | 3 | 17 | 22 | 27 | 33 | 39 |
| <i>EDI</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delegated | 0 | 0 | 1 | 1 | 2 | 3 | 4 | 5 |
| Non-delegated | 0 | 0 | 1 | 4 | 6 | 6 | 7 | 8 |
| Mixed delegation | 0 | 0 | 1 | 3 | 4 | 5 | 6 | 6 |
| <i>XML</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delegated | 0 | 0 | 0 | 2 | 5 | 6 | 8 | 10 |
| Non-delegated | 0 | 0 | 0 | 5 | 12 | 12 | 15 | 16 |
| Mixed delegation | 0 | 0 | 0 | 3 | 8 | 9 | 11 | 13 |

Many compliance reports to the EPA and state environmental agencies will require electronic signatures. EPA is using the General Services Administration's ACES contract and methods for assigning third parties to issue digital certificates and validate electronic signatures. Using this approach, the cost for each organization's authorizing individual to obtain a digital certificate will be \$20. For direct reports, the EPA will bear this cost. For reports to states, we assumed that some states will follow the EPA example while others will pass the burden on to the facilities. We, therefore, assumed that 50 percent of the facility-to-state certificate burden will fall to the state and 50 percent to the facilities. We also assumed that each facility will have an average of two signing officials and turnover in authorized signers will be 15 percent with a corresponding charge for new certificates.

³ Our investigation of the TRI program shows a 39 percent savings by submitting electronically instead of by paper. We have been conservative and reduced this to 25 percent for EDI/XML submissions, saving by preparing submissions from forms pre-populated with the previous year's submission. The 25 percent savings assumed for reporting facilities that submit via XML and EDI is a qualitative judgment based on automated data capture and transfer and the savings benchmark from the TRI program.

There also is an ongoing fee for each submission. Depending on volume, this charge can range from \$.40 to \$1.20 (we assumed a cost of \$0.60 per submission). Again, for direct reports, EPA will bear the cost, and for state reports, we assessed 50 percent each to the states and facilities.

Table 3-3 summarizes the comparison of the as-is and to-be costs for electronic reporting.

Table 3-3. Facility As-Is Versus To-Be Reporting Costs (\$ millions)

| Cost category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|
| As-is | 3,728.0 | 3,748.0 | 3,643.1 | 3,541.0 | 3,441.4 | 3,345.0 | 3,251.5 | 3,160.3 |
| To-be electronic reporting developmental costs | 0.0 | 0.0 | 52.7 | 135.6 | 213.9 | 166.9 | 208.7 | 241.6 |
| To-be reporting operational cost | 3,728.0 | 3,748.0 | 3,581.6 | 3,351.0 | 3,170.5 | 3,059.8 | 2,944.2 | 2,837.3 |
| Total to-be reporting cost | 3,728.0 | 3,748.0 | 3,634.3 | 3,486.6 | 3,384.4 | 3,226.7 | 3,153.0 | 3,078.9 |
| Difference | 0.0 | 0.0 | 8.8 | 54.4 | 57.0 | 118.3 | 98.5 | 81.4 |

Note: Details do not sum to total because of rounding.

ELECTRONIC RECORD KEEPING

Electronic record keeping will include storing electronic compliance reports in some form of magnetic device and the necessary infrastructure, labor, management, and training to sustain that data. These requirements will ensure that the data are retained in tact, unchanged, and available for retrieval and review.

CROMERRR does not mandate electronic record keeping. Further, it allows facilities to freely combine paper reporting and record keeping and electronic reporting and record keeping in any way they desire. However, CROMERRR does mandate minimum features that electronic record keeping must support. These requirements stem from the enforcement community to ensure that the electronic data have not been tampered with, reflects the data originally submitted, and “binds” the signer to the data. There also are requirements for providing readable versions for auditors and inspectors, and for ensuring risk of loss caused by intentional or accidental damage to the storage equipment and system is minimal.

Because of the extent and unique nature of these requirements, we assumed for our analysis that, unlike for electronic reporting, most reporting facilities will *not* have existing automated systems that meet CROMERRR requirements. Our review of commercial systems shows that in the first year, a low-end but scalable system costs approximately \$25,000 plus an estimated additional \$15,000 in internal labor for a training system and process set-up. We estimate annual maintenance of the software and managing the records at \$17,000. These costs are very significant.

On the basis of these costs, we assume that very few facilities (0.5 percent) will make the investment purely for implementing electronic record keeping for compliance reporting. Those that do will likely be in the FIFRA community, which must report extensively to EPA. Another group of mostly large companies have existing electronic document systems for other purposes that could (and likely already do) use them for compliance reporting. We have assigned neither costs nor savings to this group.

Table 3-4 summarizes the as-is and to-be costs for electronic record keeping. Clearly, it is expensive and if it were implemented widely to meet CROMERRR requirements, the burden would increase significantly. For these reasons, we believe implementing electronic record keeping will proceed slowly until the cost of the technology decreases.

Table 3-4. Facility As-Is Versus To-Be Record-Keeping Costs (\$ millions)

| Cost category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|--|-------|-------|-------|--------|--------|-------|-------|-------|
| As-is record-keeping cost | 135.0 | 135.7 | 131.9 | 128.2 | 124.6 | 121.2 | 117.8 | 114.5 |
| To-be electronic record-keeping developmental cost | - | - | 10.3 | 21.0 | 16.9 | 14.0 | 14.1 | 13.1 |
| To-be record-keeping operational cost | 135.0 | 135.7 | 126.6 | 121.8 | 119.5 | 117.0 | 111.7 | 105.8 |
| Total to-be record-keeping cost | 135.0 | 135.7 | 136.9 | 142.9 | 136.4 | 131.0 | 125.8 | 118.9 |
| Difference | -0.02 | 0.00 | -5.05 | -14.69 | -11.84 | -9.81 | -7.95 | -4.40 |

Summary Effect of CROMERRR on Facilities

CROMERRR does not require any additional reporting. It provides the option to report by using e-business techniques that are consistent with today's business trends.

Electronic reporting offers quantitative savings to facilities, which we expect to range between 11 to 25 percent depending on circumstance and the facility's choice of approach. Facilities that can afford to implement electronic environmental systems and, through those, implement EDI or XML will realize the greatest savings. Even these projected savings do not include potentially larger savings that facilities could realize if they implement automated monitoring and data-collection technologies. The acquisition of these technologies, combined with electronic reporting, are the best means of reducing compliance reporting burden; however, the technologies require a substantial investment cost, and a sophisticated owner or user. We have, therefore, excluded this approach for potential to-be savings.

Electronic record keeping will likely be advantageous only to organizations that already use it for other reasons. Unlike electronic reporting, there are large system costs unique to electronic record keeping. The savings of reduced paper storage and handling are more than offset by the cost of the electronic systems. In addition, electronic record keeping may put facilities at legal risk. If facilities report electronically but continue to record by paper, they will be conforming to traditional practices in responding to audits, inspections, and enforcement queries and actions. However, inadequately or improperly implementing electronic record keeping creates a risk of being out of compliance.

Table 3-5 summarizes the total facility costs for the as-is and to-be scenarios. Overall, implementing electronic reporting and record keeping reduces facility burden. In addition to specific savings identified here, facilities should benefit qualitatively from electronic reporting. We identify those benefits later.

Table 3-5. Summary of Total Facility As-Is and To-Be Costs (\$ millions)

| Cost category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|---------------|---------|---------|---------|---------|---------|---------|---------|---------|
| As-is cost | 3,863.0 | 3,883.7 | 3,775.0 | 3,669.2 | 3,566.0 | 3,466.2 | 3,369.3 | 3,274.8 |
| To-be costs | 3,863.0 | 3,883.7 | 3,771.3 | 3,629.4 | 3,520.8 | 3,357.7 | 3,278.7 | 3,197.8 |
| Difference | 0.0 | 0.0 | 3.7 | 39.8 | 45.2 | 108.5 | 90.6 | 77.0 |

STATES

The majority of the compliance reporting required by the programs we analyzed is transmitted from a facility to a delegated state environmental agency. Like EPA and industry, state governments are becoming aware of the appeal and value of EC. States are implementing a variety of e-government initiatives with the federal government, with their own agencies, with industry, and with citizens in their states. Several states have started selective e-government exchanges for environmental reporting. A few of these include TRI programs in New Jersey and Minnesota, DMR submissions in Virginia and Pennsylvania, and drinking water laboratory analysis in California and Missouri.

The analysis below is a review of state implementations of larger-scale electronic reporting programs between their regulated community and their environmental agency. As we noted earlier, state record-keeping costs and compliance reporting exchanges between states and EPA are excluded from CROMERRR.

As-Is Cost Analysis

We derived our as-is cost analysis for states from the same existing ICRs that we used for facilities. Table 3-6 summarizes the as-is costs for 25 states for the 8 years of the analysis.

Table 3-6. State As-Is Costs

| Category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|------------------------|------|------|------|------|------|------|------|------|
| Report volume (M) | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 3.0 | 3.1 |
| Reporting burden (\$M) | 58.7 | 59.0 | 57.4 | 55.8 | 54.2 | 52.7 | 51.2 | 49.8 |

As with facilities, the report volume and burden costs are increased by 4 percent to account for potential increases in reporting requirements and reporting facilities. We used the same 1.2 million facilities we used for calculating Table 3.2. The report volume is slightly lower than the facility volume because some facility reporting is direct to the federal EPA.

The as-is numbers reflect 100 percent paper-based reporting for the original ICRs. However, as we noted earlier, many states are implementing electronic reporting initiatives. The effects of these are not yet large and we did not reflect them in our cost and savings analysis.

To-Be Cost Analysis

We assumed that states that report electronically will implement comprehensive programs that will include most, if not all, of the reports covered in the scope of this study. These programs will in many ways model the EPA approach of a single point of entry into the state environmental agency and will provide convenient tools for facilities to access and submit data.

Although many states are implementing individual program areas, currently no state is undertaking a comprehensive electronic reporting program. However, we believe several states have the technical and organizational resources to do so. We, therefore, assumed a conservative implementation rate of no state implementing until FY02. We assumed five states would implement in that year and five additional states would implement each year thereafter. We assumed the program would be a comprehensive 8-year implementation. Obviously states vary tremendously in size and reporting volume. However, we treat each state equally as 2 percent of the reporting volume, recognizing that by FY07 with approximately half the states participating, some balance of large and small states implementing is likely.

Estimating the cost for states to develop and field electronic reporting is very speculative. Costs will vary tremendously depending on the size of the state, number of programs it supports, its existing infrastructure, and other variables. We believe that, at a minimum, states can benefit from lessons learned from EPA's implementation, if not directly from all or parts of the EPA infrastructure and standards. We assumed approximately \$600,000 in software costs for licenses to enterprise commercial off-the-shelf (COTS) EC program licenses, and another \$400,000 in labor to customize these systems to specific state require-

ments. We assumed hardware is reasonably available and, therefore, we did not add these costs.

Additional development costs include a modest one-time cost to “certify” the state legacy and e-government system with EPA, and the state costs for issuing the facilities’ digital certificates. As indicated in the facility section, we assumed a 50-50 sharing of these costs between the states and their facilities. These development costs are summarized by year in Table 3-7.

After the initial development year, states will incur costs to maintain their electronic reporting systems. We used a standard 20 percent of the initial costs for annual maintenance. We also incorporated 50 percent of the third-party validation of each electronically signed submission. These operational costs also are summarized by year in Table 3-7.

Table 3-7. State As-Is Versus To-Be Reporting Costs (\$ millions)

| Cost category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|---|------|------|------|------|------|------|------|------|
| As-is reporting burden | 58.7 | 59.0 | 57.4 | 55.8 | 54.2 | 52.7 | 51.2 | 49.8 |
| To-be electronic reporting developmental cost | - | - | 5.9 | 5.8 | 5.6 | 5.4 | 5.1 | 4.7 |
| To-be electronic reporting operational costs | 58.7 | 59.0 | 36.4 | 34.3 | 32.8 | 32.0 | 31.1 | 30.3 |
| Total to-be electronic reporting costs | 58.7 | 59.0 | 42.3 | 40.1 | 38.4 | 37.5 | 36.2 | 35.0 |
| Difference | - | - | 15.1 | 15.7 | 15.8 | 15.3 | 15.1 | 14.8 |

States will save significantly by using electronic reporting operations. In the current paper process, most reports are received through the mail or delivery services. They must be received, routed, logged, keyed, verified, corrected for errors, and stored. These are labor- and time-intensive tasks. Converting to electronic processes should result in significant savings. The savings derive from the following process improvements:

- ◆ Consolidation of program management
- ◆ Reduced distribution of forms
- ◆ Decreased mail receipt costs
- ◆ Reduced data entry and validation costs
- ◆ Less follow-up
- ◆ Reduced paper handling and storage.

We estimated these process savings to be approximately 18 percent compared with paper processes for web submissions and 25 percent for EDI/XML submissions. As shown in Table 3-7, this results in savings for states from FY02 through FY07. States also benefit from additional quality we discuss later.

EPA

Several EPA programs have independently implemented forms of electronic reporting in recent years. The 1996 Re-Inventing Environmental Information (REI) initiative directed EPA to dramatically increase and standardize its electronic reporting and record-keeping capabilities. In 1999, the Central Receiving Branch was established in the Office of Environmental Information to develop a CDX. The CDX is a single point of entry for both facility and state submissions to EPA and implements electronic reporting and record keeping.

This section summarizes the as-is and to-be costs for developing and operating the CDX in the CROMERRR scope. We do not separately identify electronic record keeping from reporting as both are essentially combined in the CDX hardware and software development. We also do not specifically incorporate state-to-EPA submissions, but again the infrastructure defined below will readily support those operations.

As-Is Cost Analysis

As with facilities and states, we used data from the existing ICRs for the included programs to establish the existing EPA burden. Table 3-8 summarizes the agency as-is costs.

Table 3-8. Agency As-Is Costs (\$ millions)

| Fiscal year | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | Total |
|-------------------|------|------|------|------|------|------|------|------|-------|
| Total as-is costs | 25.8 | 26.9 | 26.9 | 27.1 | 27.2 | 27.4 | 27.5 | 27.6 | 216.4 |

For direct reporting paper submissions, EPA manages (either directly or through contractors, both at headquarters and in the regions) large numbers of employees for receiving, logging, entering, verifying, and filing compliance reports. EPA also has a substantial investment in program management and information system support for these specific tasks, distributed across the program areas. Although the ICRs report the burden for the overall programs, they often do not show the specific tasks that would be most affected by the to-be conversion from paper or diskette submission to full electronic submission. To assist in that effort, LMI used detailed analysis of several programs to augment the ICR data. This additional analysis did not affect the as-is data but is used in the to-be results.

To-Be Cost Analysis

The CDX will represent the embodiment of the Government Paperwork Elimination Act (GPEA) and EPA's own REI for compliance reporting. A fully implemented CDX will be a centralized program that will

- ◆ be a single point of entry for compliance reporting for direct reporting facilities;
- ◆ be a (not single) point of entry for obtaining information about program-area-managed guidance and regulations for compliance reporting as well as other relevant information;
- ◆ present a standard look and feel to forms and standardized data;
- ◆ offer a diverse but limited set of input options for facilities and states, including paper, web forms, EDI, and XML;
- ◆ provide central registration and identity proofing that meets enforcement requirements;
- ◆ provide archiving and security for received data that meet enforcement, federal archiving, and sound business practices for the guardianship of data and systems; and
- ◆ transform and distribute data to meet the requirements of the EPA program systems, states, and other stakeholders.

The CDX is a transaction processing and throughput facility. CDX is not intended to replace program area systems or to be a general data repository and retrieval system.

The Central Receiving Branch and the CDX will consist of

- ◆ information systems hardware and software to
 - receive, process, and distribute transactions;
 - manage user registrations and digital signatures;
 - manage archiving and other record-keeping functions;
 - support web operations and information for users;
 - manage and monitor system infrastructure; and
 - interface with EPA and other stakeholder systems;

-
- ◆ staff, facilities, and processes to input paper records; and
 - ◆ staff to manage, program and coordinate with
 - EPA programs and regions;
 - states and other agencies; and
 - submitters.

TO-BE DEVELOPMENT COSTS

Work on prototyping and testing the CDX began in FY00. Testing and expanding interim operations will continue through FY02, and full operational capability will occur in FY03. After FY03, a lower level of development will continue to address new programs, forms, process re-engineering, as well as assessments and implementation of new technologies. The development costs also reflect a major hardware upgrade in FY06.

TO-BE OPERATIONS COSTS

The major operational cost driver is the CDX assumption of responsibility for receiving and processing of ongoing paper submissions. In FY03, this will continue to be a large operation, slowly declining over time as more direct submitters move toward electronic reporting. Currently, these operations are dispersed among the program-area-managed facilities and in the regions. However, the full extent of these operations is difficult to identify from the ICRs. Consolidating these efforts organizationally and by process should result in substantial savings. Operational costs will be driven primarily by the components for converting, verifying, and correcting data. The operational costs also include a component for electronic rather than paper archiving of the paper submissions.

Managing the electronic reporting component will also require maintaining hardware and software, supporting users, using outreach, and other functions. We incorporated in our assumptions both EPA's and contractors' labor and facilities to perform these functions.

A large component of the EPA's operational costs will be paying the approximately \$.90 to \$1.27, depending on volume, per transaction for validating electronic signatures through the selected Access Certificates for Electronic Services (ACES) vendor. In addition, EPA is bearing the \$20 per authorizing individual (an average of two per facility for a total of \$40 per facility), including an assumed 15 percent turnover. The model does not require individuals to double register. The costs that EPA bears for registering individuals among the approximately 90,000 facilities has been subtracted from the facility and state certification costs.

Two of our primary assumptions in the analysis are the following:

- ◆ The majority of the program areas will participate and support CDX and electronic reporting by FY03 and that CDX will begin paper reporting.
- ◆ The approximately 90,000 facilities that submit to EPA will implement at the following rate: 14 percent of submissions in FY02 and steadily increasing each year reaching a maximum 77 percent in FY07. Experience with the TRI and RMP programs shows a positive response rate that is likely to be more aggressive than we have assumed.

Table 3-9 summarizes the developmental and operational costs of the CDX. Additional detail is in Appendix D.

Table 3-9. EPA To-Be Costs (\$ millions)

| Cost | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|---------------|------|------|------|------|------|------|------|------|
| Developmental | 2.6 | 3.0 | 5.1 | 0.4 | 0.4 | 0.4 | 0.6 | 0.5 |
| Operational | 25.8 | 27.7 | 37.2 | 26.5 | 21.1 | 19.2 | 18.7 | 17.9 |
| Total | 28.4 | 30.7 | 42.3 | 26.9 | 21.5 | 19.6 | 19.3 | 18.4 |

EPA BENEFITS

EPA, like the states, significantly reduces its burden by receiving electronic instead of paper submissions. The savings derive from the following process improvements:

- ◆ Reduced forms distribution
- ◆ Decreased mail receipt costs
- ◆ Reduced data entry and validation costs
- ◆ Less follow-up
- ◆ Reduced paper handling and storage
- ◆ Consolidation of program management.

EPA likely will benefit more from consolidating program management than will the states. EPA's larger and more diverse programs require more program management (both EPA and contractor) and larger information system infrastructures that can be consolidated through the CDX.

In addition to these savings, EPA will benefit qualitatively, which we describe later. Table 3-10 compares the agency as-is and to-be costs.

Table 3-10. Agency As-Is Versus To-Be Total Costs (\$ millions)

| Cost | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|-------------------|------|-------|--------|------|------|------|------|------|
| As-is costs | 25.8 | 26.9 | 26.9 | 27.1 | 27.2 | 27.4 | 27.5 | 27.6 |
| To-be development | 2.6 | 3.0 | 5.1 | 0.4 | 0.4 | 0.4 | 0.6 | 0.5 |
| To-be operations | 25.8 | 27.7 | 37.2 | 26.5 | 21.1 | 19.2 | 18.7 | 17.9 |
| Total to-be costs | 28.4 | 30.7 | 42.3 | 26.9 | 21.5 | 19.6 | 19.3 | 18.4 |
| Difference | -2.6 | -3.87 | -15.36 | 0.17 | 5.76 | 7.74 | 8.20 | 9.28 |

SUMMARY

EPA estimates that CROMERRR could result in an average annual reduction in reporting and record-keeping costs for those information collections identified as potentially benefiting from offering an electronic reporting option. On the basis of this analysis, EPA estimates that CROMERRR could reduce the burden an average of \$52.3 million annually for those facilities reporting, \$1.6 million annually for EPA, and \$1.24 million for each of the 30 states that we assumed would implement programs during the 8 years of the analysis.⁴

Table 3-11 summarizes the costs of electronic reporting and record keeping across stakeholders to produce comprehensive results. Implementing CROMERRR will reduce the burden for EPA, states, and facilities. These savings occur because a large percentage of their ICR costs are associated, either directly or indirectly, with processing the inbound reports. In addition, especially for EPA, electronic reporting and record keeping encourages EPA and states to consolidate facilities for processing electronic records.

⁴ The costs and savings are based on FY00 dollars and a 7 percent discount rate.

*Table 3-11. Summary As-Is Versus To-Be Costs for Reporting and Record Keeping
(\$ millions)*

| Cost | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| <i>As-Is costs</i> | | | | | | | | |
| Facilities | 3,863.0 | 3,883.7 | 3,775.0 | 3,669.2 | 3,566.1 | 3,444.1 | 3,369.2 | 3,274.7 |
| States | 58.7 | 59.0 | 57.4 | 55.8 | 54.2 | 52.7 | 51.2 | 49.8 |
| EPA | 25.8 | 24.9 | 23.3 | 21.8 | 20.4 | 19.0 | 17.8 | 16.6 |
| Total | 3,947.5 | 3,967.7 | 3,855.7 | 3,746.8 | 3,640.6 | 3,515.8 | 3,438.3 | 3,341.2 |
| <i>To-Be costs</i> | | | | | | | | |
| Facilities | 3,863.0 | 3,883.7 | 3,771.3 | 3,629.4 | 3,520.8 | 3,357.7 | 3,278.7 | 3,197.8 |
| States | 58.7 | 59.0 | 42.3 | 40.1 | 38.4 | 37.5 | 36.2 | 35.0 |
| EPA | 28.4 | 28.9 | 30.9 | 18.6 | 15.0 | 12.8 | 11.5 | 10.3 |
| Total | 3,950.2 | 3,971.7 | 3,844.5 | 3,688.2 | 3,574.3 | 3,408.0 | 3,326.4 | 3,243.1 |
| Difference | -2.63 | -3.95 | 11.2 | 58.6 | 66.4 | 107.8 | 111.9 | 98.0 |

Chapter 4

Qualitative Benefits

Implementing electronic reporting and record keeping under CROMERRR will result in a number of important benefits that cannot readily be quantified. Some of the benefits are described below:

- ◆ *Responds to federal requirements:* GPEA requires federal agencies to implement Internet-based exchanges with the public by FY03. Public Law 508 also requires that federal grant making agencies use electronic means to process grant applications, awards, and related documents. These laws are a part of federal and state legislation, directives, and initiatives encouraging the implementation of e-government. CROMERRR is the policy basis for major EPA initiatives for implementing electronic environmental data exchanges with all environmental stakeholders.
- ◆ *Consistent with emerging industry commercial practices:* The implementation of e-government is a reflection of the rapid evolution of e-commerce, which has occurred in industry since the expansion of the Internet and the World Wide Web (WWW) in the early 1990s. In many ways, EPA's and state environmental agencies' implementing of electronic reporting will be more consistent with emerging practices and less burdensome to industry than paper reporting.
- ◆ *Sound environmental practice:* Part of EPA's mission is conserving environmental resources. Paper-based reporting consumes trees and other resources for printing, exchanging, reproducing, storing, and retrieving grants, permits, compliance reports, and supporting documents.
- ◆ *More rapid environmental compliance reporting:* Organizations have become increasingly environmentally conscientious. This change stems both from a desire to be good corporate citizens and from fear of product boycotts launched by environmental special interest groups or through negative media reporting. Hence, organizations, especially large companies, are becoming increasingly interested in being able to demonstrate their environmental compliance. One means to this goal is more rapid and accurate public posting of compliance data to environmental agencies.
- ◆ *Simplifies facility reporting:* Electronic reporting in general, and EPA's planned implementation specifically, supports establishing a single point of entry into agency systems. This single point of entry and contact will simplify facilities' ability to locate appropriate regulations, obtain information, ask questions, obtain forms, and submit data.

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- ◆ *More accurate data:*¹ Replacing paper forms with electronic forms will result in more accurate data. Electronic forms can perform real time edit checks that will reduce the number of input errors. These checks can range from simple verification of valid date formats to complex validations of proper nomenclature and limits of chemicals emitted into the environment. Other aspects of data accuracy include:
 - *Duplication of data entry efforts:* As they receive paper submissions, environmental agencies often key or scan in the data. That duplicative effort can result in data errors. These errors can cause confusion because the agency could act on information that is different from what the submitter believes was submitted.
 - *Time required for remediation.* When data errors are detected by agencies, remedial action must be undertaken. These remedial actions require participation by both the submitter and the receiving agencies, and are extremely time-consuming.
 - *Effect of inaccurate data.* If the data that passes through agency systems is inaccurate and made publicly available, it creates additional costs and inefficiencies and could lead to more significant problems, such as enforcement actions. The effect of inaccurate data has reached a point that EPA has initiated a data correction effort. This initiative uses help desk personnel to receive calls, take complaints, and oversee corrective action.
 - ◆ *Data becomes available more quickly:* The process of creating, mailing, receiving, entering, verifying, and correcting paper reports consumes both resources and time. This delays the ability of EPA to analyze data and make it available to the public.
 - ◆ *Serves as a foundation for further process re-engineering:* Moving data from a paper to an electronic system as early in the process as possible creates the foundation on which many work-flow re-engineering initiatives can be constructed, including the following:
 - Consolidated and integrated reporting
 - Active data retrieval from states and the establishment of the National Environmental Integrated Network
 - Integrated facility tracking between EPA programs and states

¹ We estimated the reduction of burden by using electronic forms for data entry by reporting facility, eliminating data entry by receiving agencies, and reducing data verification in our cost-benefit analysis. However, many aspects of reduced burden are difficult to quantify accurately. Other effects of data quality problems, such as effects on analysis, are impossible to estimate.

- Workflow reduction initiatives (For example, in TRI reporting, facilities submit forms directly to EPA *and*, with only minor differences, to their state. In an electronic environment, the facility could report *only* to EPA and EPA could collect the reports and forward a single electronic file to each state. This would result in small savings for the facility and significant savings for the states.)

Chapter 5

Conclusions

The United States has become an electronic society. The ensuing years included in this analysis will see an increasing use of electronic tools in all aspects of our lives. Large companies have used EDI for more than 20 years to conduct what is today called business-to-business (B2B) operations. The advent of the WWW has encouraged small and medium industries to participate as well. The WWW also sparked all sizes of companies to interact with the public for advertising, sales, payment, and other operations.

Government has lagged behind in implementing EC, but most agencies clearly are moving to adopt EC or upgrade early implementations. Using EC and process re-engineering is mandatory for the government when the public demands improved public service while agencies are working with declining budgets. EPA established the REI based on a series of reform initiatives dating back several years and observing the revolution in data exchange. EPA's direction has been reinforced by GPEA, other federal initiatives, state efforts, and industry trends. REI directed establishing CDX and agencywide electronic reporting in the EPA.

However, electronic reporting also creates new issues. One of these is the validity of electronic records in enforcement actions. Many environmental reports require that an authorized person sign them, and the individuals may be penalized for misrepresenting information, failing to report or reporting late, or operating outside of regulated limits. Violators may be subject to enforcement actions. Traditionally, these actions may, in part, be against the individual who signs the paper form. Further, most reporting regulations require the submitter to retain all reports for a number of years.

Using electronic reporting and record keeping opens questions about how electronic data can be used in enforcement actions. In particular, the question is how data can be linked to a signing official in the same way that a signature on paper can. Electronic records also are vulnerable to being altered either deliberately or accidentally after they have been electronically signed. Numerous solutions to these issues exist, but all require using tools and techniques that add to the cost of operation and are not necessarily consistent with one another.

Because of these issues, and the procedures and requirements that EPA must follow to promulgate compliance reporting rules, EPA published the CROMERRR as a single overarching cross-media program rule to validate adopting electronic reporting and defining the requirements for electronic record keeping.

In analyzing the burden of CROMERRR for this cost analysis, we must understand that a facility's adoption of CROMERRR is voluntary and recognize the role of EC in both the private and public sectors.¹

FACILITIES

One of the great advantages of EC is that it eliminates rekeying of data that originated in a trading partner's system. Typically, therefore, the initiator of any process may save less because he must create the original data. This is very much the case for compliance reporting. The receiving environmental agencies will save more than the facilities. Still, *electronic reporting will result in reducing the burden of facilities* under the following conditions:

- ◆ Reporting companies will choose to use existing computers and infrastructure to report electronically. The companies will not acquire systems primarily for compliance reporting.
- ◆ Using well-designed web forms will reduce the time to complete a form and the data will be more accurate. Accessing an environmental agency's single point of entry will help facilities obtain key environmental compliance information and ensure correct and timely submission of reports.
- ◆ Adopting automated monitoring equipment and systems coupled with electronic reporting through EDI or XML (both of which also can be used without automated monitoring systems) will yield even greater savings, although at a higher investment cost.
- ◆ Electronic reporting and data collection can be used as the basis for further compliance reporting reengineering, which will reduce the burden more for all.
- ◆ Stakeholders will gain important qualitative advantages. For example, the public and companies spurred on by environmental interest groups, are becoming increasingly environmentally conscious. Companies are, therefore, very interested in proving their environmental compliance both quickly and accurately.

Electronic record keeping is less cost-effective. Most small- to medium-size organizations do not have automated electronic record-keeping systems that will meet CROMERRR requirements. Acquiring and implementing even low-end systems is likely to cost \$40,000 or more. This cost is prohibitive for solely preserving environmental compliance reports. However, larger organizations that do have electronic record-keeping systems for other purposes most likely can expand the systems to accommodate electronic compliance reports at little added expense. Because of these issues, CROMERRR separates electronic reporting from

¹ Cost estimates were based on FY00 dollars and use a 7 percent discount rate.

electronic recording keeping. Organizations that submit electronically may print, sign, and store the paper copies of their electronic submissions. For selected reports, EPA also may send the submitter an official copy of record for the submitter to print and retain. Most organizations probably will choose to report electronically and maintain paper records until technologies evolve that are simultaneously cost effective to implement and sufficiently secure as to meet enforcement and archiving requirements.

STATES

States receive the bulk of compliance reports and represent the front line for generating public trust that organizations are complying with environmental laws and that aggregate trends are being monitored. However, the states often try performing these functions with small budgets and staffs that must use outdated equipment.

Records processed through electronic reporting will reduce costs for receiving, entering, verifying, and storing records. The major difficulty for states probably will be securing the initial investment capital and organizational focus to achieve the return on investment. States also will gain the numerous qualitative advantages enumerated earlier. Although the effect of state electronic record keeping is outside the scope of this study, we believe that states will be in a better position to keep records electronically by using existing systems than facilities are.

Although not a subject of our cost-benefit analysis, multi-state implementation of electronic registration, certification, and digital signatures will affect savings. Most states have passed digital signature laws. However, the states' specific implementation approaches for both electronic reporting and electronic signatures may vary from one another's and from EPA's. Charges for these services also may vary. EPA is bearing the cost for direct reports, but we anticipate that some states may pass on the costs to facilities. In general, the more the states and EPA can implement common or interoperable approaches, the greater will be the savings that accrue to all participants. Standardization applies not only to electronic reporting, but also is an issue for other factors, such as data elements and facility identification. Electronic reporting and increasing interest in data sharing are going to intensify the need for increased collaboration among regulating agencies.

EPA

Although EPA foresees electronic reporting as a benefit to the agency and other stakeholders, electronic reporting is virtually required by GPEA and other federal initiatives. As with the states, by using electronic reporting, the agency will save over paper processing of compliance reports. Because of the number and scope of its program areas, EPA is far more likely to benefit than states by using a central data processing exchange for leveraging its staff and physical resources.

EPA also is in the best position to incorporate electronic record keeping into its operations. However, even for EPA, using GSA's approach for digital certificates and validation of electronic signatures is expensive. EPA should work with the GSA and ACES vendors to determine ways of lowering the costs for such a large operation.

SUMMARY

For EPA, the average annual cost to implement and operate electronic reporting and record keeping is \$19.6 million. The average annual cost savings compared to equivalent paper-based systems is \$1.6 million. The average annual cost to implement an electronic reporting system is \$1.1 million for each state, and \$1,273 for each facility. The net average annual cost savings of submitting reports electronically compared with the equivalent paper-based submission is \$1.24 million for each state, and \$1,140 for each facility. The total average annual costs of implementing and reporting electronically for all facilities is \$3,430 million, which represents a net average annual savings for all facilities of \$52.3 million. The average annual cost to implement a new electronic record-keeping system is \$40,000 for each facility, and the net average annual cost savings for operating the electronic record-keeping system is \$23,080.

These costs are based on FY00 dollars and include a 7.0 percent annual discount rate. Therefore, our estimates indicate that implementing electronic reporting will reduce the net burden for all participants, but for facilities, developing an electronic records system may not be cost effective unless it addresses both EPA and non-EPA business purposes. However, it will require several years to overcome initial investment for electronic processing, record keeping, and digital certificates and signatures. The rate at which industry responds also will dramatically affect savings, and our analysis uses very conservative implementation rates. Electronic record keeping will require more research, application of technology, and coordination between enforcement requirements and workable solutions before it becomes cost effective for facilities.

Even modest savings combined with qualitative advantages, which include establishing an electronic base of data, and emerging technologies to better share data and reengineer processes, makes electronic reporting and record keeping an imperative.

Appendix A

Information Collection Requests

We extracted as-is costs for the programs and reporting requirements from the recent information collection requests (ICRs) listed in Table A-1 and LMI regulatory cost analysis reports for the Toxics Release Inventory (TRI) and National Pollutant Discharge Elimination System (NPDES)/discharge monitoring report (DMR). We separated costs among the different stakeholders (EPA, states, and facilities) and also allocated the costs to either reporting or record keeping as applicable.

In selecting ICRs, we reviewed a list of all ICRs from EPA's comprehensive ICR tracking system (i.e., the Paperwork Reduction Act Management System). We decided to include or not include ICRs according to the following parameters:

- ◆ Include the ICRs that are under consideration for the current electronic reporting effort.
- ◆ Include the ICRs that could be considered for future electronic reporting efforts.
- ◆ Do not include the ICRs for programs that have electronic reporting already in place (e.g., air emissions inventory reporting) with the understanding that these collections do not have legal impediments to collecting the data electronically and, therefore, will not be affected by the Cross-Media Electronic Reporting and Records Rule (CROMERRR).
- ◆ Do not include the ICRs for programs that are not now nor expected to be candidates for electronic reporting to EPA or a delegated state program (i.e., the EPA collections, such as grants, that are not established in 40 CFR and the 40 CFR requirements expected to have little or no effect on compliance reporting for CROMERRR).

We concentrated our efforts on the program-specific ICRs that electronic reporting would significantly affect and we organized the list by EPA statute areas. We concentrated on the more burdensome reporting programs with the largest reporting component and uniformity. Some ICRs were not included because of the small reporting component. For the Office of Air and Radiation ICRs (National Emissions Standards for Hazardous Air Pollutants [NESHAP] and New Source Performance Standards [NSPS]), we extrapolated the reporting burden according to the similarity and number of reports. The reporting estimate reflects the burden based on programs affected by CROMERRR. Our estimate is conservative because it does not take into account increases in future collection efforts. Also, we

based the potential effects on the state or federal government of compliance reporting and record keeping on the delegation and implementation responsibility.

Table A-1. ICRs Reviewed

| ICR number | ICR Name | Date |
|------------|--|----------------|
| CAA | | |
| 1656.06 | Risk Management Program (RMP) Rule | June 1999 |
| 1663.02 | Compliance Assurance Monitoring (CAM) Rule | October 1997 |
| 1739.03 | NESHAP for the Printing and Publishing Industry | January 2000 |
| 1657.03 | NESHAP for Total HAP Emissions from the Pulp and Paper Production Source Category—Process Operations (Record-keeping and Reporting Requirements) | April 1998 |
| 1414.03 | Hazardous Organic NESHAP (HON) for the SOCM and Other Processes | October 1997 |
| 0111.09 | NESHAP for Asbestos (Part 61, Subpart M) | November 1999 |
| 1088.09 | NSPS for Steam Generating Units, Sulfur Dioxide, Nitrous Oxide, Particulate Matter | January 2000 |
| 1052.06 | NSPS: Fossil Fuel Fired Steam Generating Units (Subpart D) | December 1999 |
| 1156.08 | NSPS for Synthetic Fiber Production Facilities (Subpart HHH) | September 1999 |
| 1071.06 | NSPS for Stationary Gas Turbines (Subpart GG) | November 1997 |
| 1062.06 | NSPS for Coal Preparation Plant—Subpart Y | July 1998 |
| 1060.10 | NSPS for Steel Plants: Electric Arc Furnaces and Decarburization Vessels (Subparts AA and AAa) | April 1999 |
| 1587.05 | CAA Title V—Operating Permits Regulations—Information Requests | February 2000 |
| 1633.12 | Acid Rain Program under Title IV of the CAA Amendments of 1990 | April 1999 |
| CERCLA | | |
| 1304.05 | “Application for Preauthorization of a CERCLA Response Action” and “Claim for CERCLA Response Action” | December 1997 |
| 1445.04 | Continuous Release Reporting Regulation under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 | September 1997 |

Table A-1. ICRs Reviewed (Continued)

| ICR number | ICR Name | Date |
|------------|---|---------------|
| EPCRA | | |
| 1395.04 | Emergency Planning and Release Notification Requirements (EPCRA) Sections 302, 303 and 304) (This ICR was used separately for ERNS relates burden and Form R/A Burden) | November 1999 |
| 1352.07 | Community Right-to-Know Reporting Requirements under Sections 311 and 312 of the Emergency Planning and Community Right-to-Know Act (EPCRA) | January 2000 |
| 1428.05 | Trade Secret Claims for Emergency Planning and Community Right-to-Know Information | February 2000 |
| 1363.09 | (PBT Final Rule) Toxic Chemical Release Reporting, Recordkeeping, Supplier Notification and Petitions under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) | July 1999 |
| FIFRA | | |
| 0277.11 | Application for New or Amended Pesticide Registration | July 1998 |
| 0143.06 | Recordkeeping Requirements for Producers of Pesticides under Section 8 of the FIFRA | June 1998 |
| 0596.06 | Application and Summary Report for an Emergency Exemption for Pesticides | June 1998 |
| 0595.07 | Notice of Pesticide Registration by States to Meet a Special Local Need (SLN) under FIFRA Section 24(c) | July 1999 |
| 0601.06 | Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Section 29 Annual Report on Conditional Registrations | July 1999 |
| 0152.06 | Notice of Arrival of Pesticides and Devices | May 1999 |
| 0276.09 | Application for Experimental Use Permit (EUP) to Ship a Pesticide for Experimental Purposes Only | May 2000 |
| 0161.08 | Export Policy: Purchaser Acknowledgement Statement for Unregistered Pesticides | June 1999 |
| 0278.07 | Notice of Supplemental Distribution of a Registered Pesticide Product | July 2000 |
| 0597.07 | Maximum Residue Limit (MRL) Petitions on Food/Feed Crops and New Inert Ingredients | July 2000 |
| 1503.03 | Data Acquisition for Registration | October 1997 |
| 0160.06 | Application for Pesticide-Notification-Producing Establishments—Pesticide Report for Pesticide-Producing Establishments | March 1999 |

Table A-1. ICRs Reviewed (Continued)

| ICR number | ICR Name | Date |
|------------|---|----------------|
| CWA | | |
| 0168.07 | NPDES and Sewage Sludge Management State Programs | September 1999 |
| 0229.11 | DMR ICR | April 1998 |
| 1427.05 | NPDES Compliance Assessment/Certification Information | |
| 1820.02 | Phase II of the NPDES Stormwater Program (Final Rule ICR) | July 1999 |
| 0226.15 | Applications for NPDES Discharge Permits and the Sewage Sludge Management Permits | October 1999 |
| RCRA | | |
| 0262.09 | RCRA Hazardous Waste Permit Application and Modification, Part A | August 1999 |
| 0261.13 | Notification of Regulated Waste Activity | August 1999 |
| 0820.07 | Hazardous Waste Generator Standards | December 1997 |
| 1286.05 | Used Oil Management Standards Record-keeping and Reporting Requirements | March 1999 |
| 1597.03 | Reporting and Recordkeeping Requirements for Universal Waste Handlers and Destination Facilities | March 1998 |
| 0801.12 | Requirements for Generators, Transporters and Disposers under the RCRA Hazardous Waste Manifest System | July 1999 |
| 0976.09 | 1999 Hazardous Waste Report | December 1998 |
| 1647.02 | Exports from and Imports to the United States under the OECD Decision | January 1998 |
| TSCA | | |
| 1011.04 | Partial Updating of TSCA Inventory Data Base; Production and Site-Reports | January 1998 |
| 0586.08 | Toxic Substances Control Act (TSCA) Section 8 Preliminary Assessment Information Rule (PAIR) | October 1997 |
| 1365.05 | Asbestos-Containing Materials in Schools Rule and Asbestos Model Accreditation Plan Rule (MAP) | January 1998 |
| 0795.10 | TSCA Section 12(b) Notification of Chemical Exports | August 1999 |
| 0574.00 | Premanufacture Review Report and Exemption Requirements for New Chemical Substances and Significant New Use Report and Record-keeping Requirements for Chemical Substances—Addendum to include the Final Rule for Certain Microbial Products of Biotech | July 2000 |
| 0575.08 | Health and Safety Data Reporting; Submission of Lists and Copies of Health and Safety Studies | January 1998 |

Under each of the eight programs we reviewed, we only included the reports that involve facility-to-EPA reporting or facility-to-state or facility-to-local agency reporting. We assumed that costs of states reporting information to EPA were not necessary for this analysis.

Because each ICR covers a unique reporting requirement and each program is unique, we made several assumptions to arrive at the as-is costs.

- ◆ Under the Clean Air Act program, many NSPSs and NESHAPs exist.
 - We derived NSPS costs estimates from ICR information obtained from public sources. We reviewed six ICRs in detail and extracted total facility burden from 58 ICRs. We estimated the total facility burden for all NSPSs by extrapolating the burden from the 58 ICRs to the total of 77 NSPSs. We estimated reporting and record-keeping burdens by using the combined reporting to record-keeping ratio from the six ICRs detailed. Likewise, we estimated the ratio of EPA-to-facility burden by using the six ICRs we reviewed and applied to estimate agency costs. In addition, we averaged the labor rates from the detailed ICRs to estimate the total costs for NSPS requirements.
 - Likewise, we derived the NESHAP costs estimates from ICR information obtained from public sources. We reviewed three ICRs in detail and extracted the total facility burden from 46 ICRs. We estimated the total facility burden for all NESHAPs by extrapolating the burden on the 46 ICRs to the total of 71 NESHAPs (72 total less the asbestos NESHAP, see below). We estimated reporting and record-keeping burdens by using the combined reporting-to-record-keeping ratio from the six ICRs detailed. We estimated the ratio of EPA-to-facility burden by using the six ICRs reviewed and applied to estimate agency costs. In addition, we averaged the labor rates from the detailed ICRs to estimate the total costs for NESHAP requirements.
 - Because of its size and relative effect, we evaluated the asbestos NESHAP separately from the other 71 NESHAPs.
- ◆ Where costs were not specifically allocated to either reporting or record keeping, we used the ICR cost-activity descriptions to either allocate costs to one of the categories or to disregard the costs from this analysis.
- ◆ We took the facility count and the number of direct reporting facilities from the total number of EPA facilities identified in the *EnviroFacts* database (1,200,000 and 90,000, respectively).
- ◆ We derived the average wage rates (Table A-2) by taking the wage rates presented in the various ICRs by labor category by stakeholder, correcting the rates to FY00 dollars using the Consumer Price Index, and averaging the corrected rates.

Table A-2. Average Wage Rates (\$)

| Stakeholder | Managerial | Technical | Clerical | Legal |
|-------------|------------|-----------|----------|-------|
| Facility | 84.33 | 55.56 | 27.22 | 99.78 |
| State | 48.32 | 33.36 | 20.65 | — |
| EPA | 66.14 | 43.14 | 22.79 | — |

- ◆ For TRI and NPDES, our assumption was that 91 percent of costs for compliance and enforcement, information systems, and program management were because of reporting and the other 9 percent were because of record keeping. We based the allocation of these costs on a draft cost analysis of the TRI reporting program.¹ The limited analysis showed that annual data archive or record-keeping costs for reporting facilities were approximately 9 percent of the total functional costs for receiving mail and capturing, reconciling, archiving, distributing data. Accordingly, we allocated the costs for compliance and enforcement, information systems, and program management between record-keeping and reporting costs according to these percentages.
- ◆ Total record-keeping costs from the ICRs for facilities ranged from \$1.40 per report to \$810 per report. This variation is primarily caused by inconsistent definitions of “record keeping.” To remove this variation from the analysis, we used a weighted average rate of \$46.57 per report per stakeholder for as-is record-keeping activities in place of the ICR costs. This rate is a weighted average rate we derived from 7 ICRs that listed facility record keeping as a line item.

¹ The functional costs are based on a series of interviews with the EPCRA Reporting Center and detailed cost information data provided by a reporting facility.

Appendix B

Facility As-Is and To-Be Costs

This appendix contains the following information about facility costs, divided into three sections: information sources, key assumptions, and a high-level cost comparison for the as-is and to-be business processes.

INFORMATION SOURCES

We used the following information sources for developing the facility cost estimates:

- ◆ Information collection requests (ICRs)
- ◆ Conversations and correspondence with EPA headquarters' subject-matter experts
- ◆ LMI business process and cost analyses for EPA's Toxic Release Inventory and National Pollutant Discharge Elimination System/discharge monitoring report programs
- ◆ Paperwork Reduction Act Management System database
- ◆ EPA's *Envirofacts* database
- ◆ General Services Administration publications.

KEY ASSUMPTIONS

- ◆ With respect to the LMI studies, we assumed that functional activity costs for compliance and enforcement, information system, and program management are 91 percent related to reporting requirements and 9 percent related to record-keeping requirements.
- ◆ Because of variability in the ICR definitions of record keeping, we assumed the definition included data processing, logging, actual filing, and any required retrieving of archived reports. We used a cost of \$46.57 per submission to estimate the as-is record-keeping costs based on data derived from the TRI report.
- ◆ We derived salary estimates, normalized to FY00 dollars, by using the General Schedule Locality Rates of Pay (locality table for geographic

areas or rest of United States) and/or as presented in the ICRs or in LMI reports.

- ◆ We converted all previous year costs to FY00 dollars.
- ◆ We discounted out-year costs 7.0 percent.
- ◆ The cost of processing confidential business or financially sensitive information is not significantly greater than the cost of processing “normal” submissions.
- ◆ For each primacy type (state-delegated, non-delegated, and mixed delegation), we estimated an implementation model. Each model included annual implementation rates for web-based and EDI/XML, paper, and transmissions.
- ◆ The total number of submissions will increase by 4 percent per year.
- ◆ Although regulations may change and facilities may open and close, the number of regulated facilities for all program areas remains constant.
- ◆ Facilities that want to use the Central Data Exchange to report electronically already possess the necessary electronic capability.
- ◆ We applied an 11 percent savings rate for web-based reporting and a 25 percent savings rate for EDI/XML reporting.

COST COMPARISON

On the basis of the data sources and key assumptions, we used the following drivers to calculate overall cost for the as-is and to-be systems:

- ◆ Reporting
- ◆ Record keeping
- ◆ EDI/XML mapping
- ◆ Initial signature certification
- ◆ Security and signature authentication
- ◆ Signature certification caused by manager turnover.

Reporting Costs

Reporting costs are based on the total number of burden hours for each report, divided by the number of submissions to compute a burden hour rate per submission. We multiplied this burden rate by the estimated savings rate to derive the new burden rate per submission due to electronic reporting. We multiplied this derived burden rate by the number of annual submissions based on an assumed implementation rate and an hourly rate to derive the to-be cost for reporting. The calculation can be summarized as follows:

- ◆ Burden hours divided by number of submissions equals burden hour rate per submission.
- ◆ Burden hour rate per submission multiplied by the savings rate equals revised burden hour rate per submission.
- ◆ Annual submission multiplied by the electronic implementation rate equals electronic submissions.
- ◆ Electronic submissions multiplied by the revised burden hour rate per submission, which is multiplied by the hourly rate equals to-be reporting burden.

Record-Keeping Costs

We estimated the paper record-keeping costs at \$46.57 per submission.

We estimated the costs for developing electronic record keeping as follows:

- ◆ Software: \$25,000
- ◆ Labor to implement software: \$15,000.

We estimated the operational costs for electronic record keeping as follows:

- ◆ Annual software license renewal cost: \$350
- ◆ Recording cost for electronic storage per submission: \$0.50.
- ◆ Software maintenance: \$5,000
- ◆ Labor maintenance: \$12,000.

EDI/XML Mapping

We estimated the mapping costs as a one-time cost of \$4,000 per form per implementing facility.

Signature Certification

Signature certification is the cost to obtain certification for electronic signatures. The one-time cost is \$20 per person authorized to sign. We assumed that two people per facility would have to be certified. Because the certification cost for non-delegated facilities will be borne by EPA, we subtracted the number of non-delegated facilities from the total number of facilities to derive the number of facilities requiring certification. Our assumption was that the cost would be shared with the states on a 50/50 basis.

Security/Signature Authentication

For each electronic submission to a state requiring a signature, the cost is \$0.60, which we assumed would be shared equally by the state and the facility.

Signature Re-Certification

Our assumption was that in 15 percent of the facilities implementing electronic reporting, the manager would change. In addition, we assumed that the new manager would have to be certified at a cost of \$10 for the facility and \$10 for the state.

Average Annual Costs

We computed the average implementation costs per facility for electronic reporting by dividing the implementation costs per fiscal year by the number of facilities implementing that fiscal year. We computed average annual savings per facility by dividing the difference between the as-is reporting burden and the to-be reporting burden by the number of facilities implementing in that fiscal year.

We computed the average annual savings per facility for electronic record keeping by dividing the difference between the total as-is record-keeping costs and to-be record-keeping costs with electronic storage divided by the number of facilities implementing electronic storage that fiscal year.

Table B-1. summarizes the average as-is and to-be costs by fiscal year.

Table B-1. Facility To-Be Average Discounted Costs (\$ M)

| Category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | Average |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| As-is costs | 3,728.0 | 3,748.0 | 3,643.1 | 3,541.0 | 3,441.4 | 3,345.0 | 3,251.5 | 3,160.3 | 3,482.3 |
| To-be costs | 3,728.0 | 3,748.0 | 3,634.3 | 3,486.6 | 3,384.4 | 3,226.7 | 3,153.0 | 3,078.9 | 3,430.0 |
| Difference | 0.0 | 0.0 | 8.8 | 54.4 | 57.0 | 118.3 | 98.5 | 81.4 | 52.3 |

Appendix C

State As-Is and To-Be Costs

This appendix contains the following information about state costs, divided into three sections: information sources, key assumptions, and a high-level cost comparison for the as-is and to-be business processes.

INFORMATION SOURCES

We used the following information sources for developing the state cost estimates:

- ◆ Information collection requests (ICRs)
- ◆ Conversations and correspondence with EPA headquarters' subject-matter experts
- ◆ LMI business process and cost analyses for EPAs Toxics Release Inventory and National Pollutant Discharge Elimination System/discharge monitoring report programs
- ◆ Paperwork Reduction Act Management System database
- ◆ EPA's *Envirofacts* database
- ◆ General Services Administration publications.

KEY ASSUMPTIONS

- ◆ With respect to the LMI studies, we assumed that functional activity costs for compliance and enforcement, information system and program management are 91 percent related reporting requirements and 9 percent related to record-keeping requirements.
- ◆ We derived our salary estimates, normalized to FY00 dollars, by using General Schedule Locality Rates of Pay (locality table for geographic areas or rest of United States) and/or as presented in the ICRs or in LMI reports.
- ◆ We converted all previous year costs to FY00 dollars.
- ◆ We discounted out-year costs 7 percent.

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- ◆ We estimated fringe and indirect (i.e., overhead and general and administrative costs) rates at salary plus 25 percent each unless the percentage rates were otherwise provided.
 - ◆ The average full-time equivalent is paid on the basis of 2,080 hours or 260 workdays per year.
 - ◆ The cost of processing confidential business or financially sensitive information is not significantly greater than the cost of processing “normal” submissions.
 - ◆ The total number of submissions will increase by 4 percent per year.
 - ◆ Although regulations may change and facilities may open and close, the number of regulated facilities for all program areas remains constant.
 - ◆ The cost for the capability to communicate electronically with the Central Data Exchange (CDX) will be the same regardless of the state’s size, number of regulated entities, delegation status, or the existence of a legacy system or one being developed.
 - ◆ We applied an 18 percent savings rate for web-based reporting (because of the savings from capturing more data) and a 25 percent savings rate for EDI/XML reporting.

COST COMPARISON

On the basis of data sources and key assumptions, we used the following costs to calculate the state costs for the as-is and to-be systems:

- ◆ Reporting
- ◆ EDI/XML mapping
- ◆ Hardware and software
- ◆ System maintenance
- ◆ Facility certification cost sharing.

Reporting Costs

We based the reporting costs on the total number of burden hours for each report divided by the number of submissions to compute a burden hour rate per submission. We multiplied this burden rate by the estimated savings rate to derive the new burden rate per submission for reporting electronically. We multiplied this derived burden rate by the number of annual submissions according to an

assumed implementation rate and an hourly rate to derive the to-be cost for reporting. The to-be cost for reporting can be summarized as follows:

- ◆ Burden hours divided by number of submissions equals burden hour rate per submission.
- ◆ Burden hour rate per submission multiplied by the savings rate equals revised burden hour rate per submission.
- ◆ Annual submission multiplied by the electronic implementation rate equals electronic submissions.
- ◆ Electronic submissions multiplied by the revised burden hour rate per submission multiplied by the hourly rate equals the to-be reporting burden.

EDI/XML Mapping

We estimated the mapping as a one-time cost of \$4,000 per form per implementing state.

Hardware and Software

We estimated the hardware and software costs at \$600,000 per implementing state. Also, the labor cost is \$200,000 for a state to establish an electronic system.

System Maintenance

We estimated the annual system maintenance costs at 20 percent of the hardware and software cost.

Facility Certification Cost Sharing

This is the cost to obtain certification for electronic signatures. Certification is a one-time cost of \$20 per person authorized to sign. We assumed that two people at each facility will need to be certified. Because the certification cost for non-delegated submissions will be borne by the EPA, we subtracted the number of non-delegated facilities from the total number of facilities to derive the number of facilities requiring certification. Our assumption was that the states would share this cost on a 50/50 basis. Also, we assumed that in 15 percent of the facilities implementing electronic reporting, the manager would change and that another certification would have to be obtained for the new manager. Last, the cost for each electronic submission to a state requiring a signature is \$0.60, which is shared by the state and the facility.

Annual Average Costs

We computed the annual average savings per state by dividing the savings per year by the total number of states implementing (5 per year), and then taking the average of this computation for the years 2002 through 2007. We computed the average costs savings by dividing the costs by the number of states implementing.

Table C-1 summarizes the average savings and average to-be costs by fiscal year.

Table C-1. State To-Be Average Discounted Costs and Savings (\$ millions)

| Category | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | Average |
|-----------------|------|------|------|------|------|------|------|------|---------|
| Average costs | N/A | N/A | 1.18 | 1.16 | 1.12 | 1.08 | 1.01 | 0.94 | 1.08 |
| Average savings | N/A | N/A | 3.02 | 1.57 | 1.05 | 0.76 | 0.60 | 0.49 | 1.24 |

Appendix D

EPA As-Is and To-Be CDX Costs

This appendix is divided into three sections: information sources, key assumptions, and a high-level cost comparison for the as-is and to-be business processes.

INFORMATION SOURCES

We used the following information sources for developing the EPA cost estimates:

- ◆ Information collection requests (ICRs)
- ◆ Conversations and correspondence with EPA headquarters' subject-matter experts
- ◆ LMI business process and cost analyses for EPA's Toxics Release Inventory and National Pollutant Discharge Elimination System/discharge monitoring report programs
- ◆ Paperwork Reduction Act Management System database
- ◆ EPA's *Envirofacts* database
- ◆ General Services Administration publications.

KEY ASSUMPTIONS

- ◆ With respect to the LMI studies, we assumed that functional activity costs for compliance and enforcement, information system and program management are 91 percent related to reporting requirements and 9 percent related to record keeping requirements.
- ◆ Because of the variability in the ICR definitions of record keeping, we assumed the definition to only include data processing, logging, actual filing, and any required retrieving of archived reports.
- ◆ We derived the salary estimates by using rates presented in the ICRs.
- ◆ We discounted the out-year costs 7 percent.

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- ◆ We estimated the fringe and indirect (i.e., overhead and general and administrative costs) rates at salary plus 25 percent each unless the percentage rates were otherwise provided.
 - ◆ The average full-time equivalent (FTE) is paid on the basis of 2,080 hours or 260 workdays per year.
 - ◆ The cost of processing confidential business or financially sensitive information is not significantly greater than the cost of processing “normal” submissions.
 - ◆ The number of direct report electronic submissions will increase over time and peak at 77 percent of all submissions in FY07.
 - ◆ The total number of submissions will increase by four percent per year.

COST DRIVERS

On the basis of the data sources and key assumptions, we used the following cost drivers to calculate overall cost for the to-be system:

- ◆ Hardware
- ◆ Software
- ◆ Labor
- ◆ System maintenance
- ◆ Security and signature authentication.

As the to-be system comes on-line, EPA, its partners, and the regulated community will reduce burden, improve data accuracy and quality, and ensure easier and more rapid public access.

The primary developmental costs in FY00 through FY02 are hardware, software, and contract labor costs to develop a prototype Central Data Exchange (CDX) system and to develop a redundant production system. Also included in the developmental costs is labor for 5.5 EPA FTEs to manage the program. Hardware and software costs greatly decrease in the out years and include \$200,000 a year to refine the hardware and software and \$300,000 per year for contract labor to further refine the system. A “hardware refresh,” included in FY06, is \$300,000.

The primary operational cost in FY00 through FY02 is labor to support paper processing and record keeping. A 12-person contract contingent is added in FY03, and the EPA FTEs are increased to 8, to administer the CDX system to support electronic submissions. Electronic record-keeping costs begin in FY02 with the purchase of a \$25,000 software system to support digital signatures, the purchase

of ACES signature-validation certification certificates and the payment of signature transaction fees for the reports furnished to EPA by the direct reporting facilities and states. Maintenance costs become a big cost driver in FY03. The most significant maintenance cost is for leasing a facility to support EPA reporting. The cost for the FY03 lease is estimated at \$7.1 million dollars. FY04 through FY07 costs decrease approximately \$1.5 million dollars a year.

Table D-1 summarizes the developmental and operational costs by cost driver and fiscal year.

Table D-1. EPA To-Be Discounted Costs (\$ millions)

| Cost drivers | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hardware | .06 | .03 | .69 | .08 | .08 | .07 | .28 | .06 |
| Software | .11 | .23 | .47 | .08 | .08 | .07 | .07 | .06 |
| Labor | 28.24 | 28.62 | 29.16 | 10.50 | 8.22 | 6.85 | 6.02 | 5.41 |
| System maintenance | 0.00 | 0.00 | .080 | 6.71 | 5.80 | 4.99 | 4.58 | 4.10 |
| Signature authentication | 0.00 | 0.00 | 0.55 | 1.24 | 0.88 | 0.75 | 0.64 | 0.66 |
| Total | 28.40 | 28.89 | 30.96 | 18.62 | 15.06 | 12.74 | 11.58 | 10.30 |

The primary to-be cost drivers are labor and system maintenance. Signature authentication, hardware, and software comprise the remaining components of the total cost.

The cost for labor decreases significantly in FY03 as the CDX system is fielded. Primarily, the cost decreases because 45 percent of the total direct reporting submissions in FY03 are electronic. The projected cost for labor to process paper reporting and record keeping in FY03 is \$10.5 million dollars versus a cost in FY02 of \$29.2 million dollars to support paper reporting and record keeping. The percentage of electronic transactions increases to 59 percent in FY04 and reaches 77 percent in FY07.

CDX system maintenance is the next largest cost. Maintenance consists of hardware and software maintenance, facilities, supplies, and consumables. Hardware and software maintenance is based on 20 percent of the hardware costs from FY01 through FY02. Facility costs are divided into three areas: lease, building costs (utilities, etc.), and power and communications for the CDX system. The lease costs are based on 200 square feet for a manager and 100 square feet for technicians and clerical personnel at \$30 a square foot per month. Building costs are based on hardware costs of \$7.35 a square foot. Supplies and consumables are based on two percent of the annual labor cost.

The next largest cost is for electronic signature authorization. The cost consists of three components: a \$20 cost for a certificate (two certificates per facility/state), a transaction cost based on the number of transactions (ranges from (\$0.90 to \$1.27 a transaction), and a turnover cost based on an annual personnel turnover of

15 percent. The costs for digital signature authentication are primarily for the digital certificates for the NPDES/DMR program.

AVERAGE ANNUAL COSTS

We calculated the average annual costs by averaging the to-be costs for the years 2000 through 2007. We calculated the average annual savings by averaging the difference between the as-is costs and the to-be costs for the years 2000 through 2007.

Table D-2 summarizes the average as-is and to-be costs by fiscal year.

Table D-2. EPA To-Be Average Discounted Costs (\$ millions)

| | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | Average |
|-------------|------|------|------|------|------|------|------|------|---------|
| As-is costs | 25.8 | 24.9 | 23.3 | 21.8 | 20.4 | 19.0 | 17.8 | 16.6 | 21.2 |
| To-be costs | 28.4 | 28.9 | 31.0 | 18.6 | 15.1 | 12.7 | 11.6 | 10.3 | 19.6 |
| Difference | -2.6 | -4.0 | -7.7 | 3.2 | 5.3 | 6.3 | 6.2 | 6.3 | 1.6 |

Appendix E

Abbreviations

| | |
|----------|---|
| ACES | Access Certificates for Electronic Services |
| B2B | business-to-business |
| CAA | Clean Air Act |
| CBA | cost-benefit analysis |
| CDX | Central Data Exchange |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COTS | commercial off-the-shelf |
| CROMERRR | Cross-Media Electronic Reporting and Records Rule |
| CWA | Clean Water Act |
| DMR | discharge monitoring report |
| EC | electronic commerce |
| EDI | electronic data interchange |
| EMS | environmental management system |
| EPA | U.S. Environmental Protection Agency |
| EPCRA | Emergency Planning and Community Right-To-Know Act |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FY | fiscal year |
| GPEA | Government Paperwork Elimination Act |
| GSA | General Services Administration |
| ICR | information collection request |
| ID | identification |
| LMI | Logistics Management Institute |
| NESHAP | National Emissions Standards for Hazardous Air Pollutants |
| NPDES | National Pollution Discharge Elimination System |
| NSPS | New Source Performance Standards |
| PKI | public key infrastructure |
| PWSS | Public Water Supply System |

| | |
|-------|---|
| RCRA | Resource Conservation and Recovery Act |
| REI | Re-Inventing Environmental Information |
| RMP | risk management plan |
| TNRCC | Texas Natural Resources Conservation Commission |
| TRI | Toxics Release Inventory |
| TSCA | Toxic Substances Control Act |
| WWW | World Wide Web |
| XML | eXtensible markup language |